***Project type**:* Implementation

Title: Evaluation of foliar fungicide use to improve yield and quality of BMR corn silage

Project Leader(s): Kevin H. Ganoe, Cornell Cooperative Extension Central New York Dairy and Field Crops team and George Wilkinson, Cornell Cooperative Extension of Herkimer County

Cooperator(s): Jon Prokop, Crossbrook Dairy Farm, Middleburg, NY

Abstract: Foliar fungicides may be used to control corn diseases but little or no local or state data is available to show their effectiveness. In particular there is concern that brown mid rib (BMR) corn hybrids are more susceptible to diseases and correspondingly may have more mycotoxins in the harvested forage. Results from this project suggest that applying a foliar fungicide to BMR corn may provide a modest increase in yield (.4 tons per acre) but not enough yield to pay for the cost of the application (1.24 tons per acre).

Background and Justification: Over the past few years the use of fungicides to control corn diseases has gained momentum given the availability of fungicides and increased corn prices. In particular there has been discussion of the use of fungicides on brown mid rib (BMR) corn hybrids which are perceived to be more susceptible to corn diseases and also then assumed to have more mycotoxins present in the corn silage. The Central New York Dairy and Field Crops Team has been actively involved with a number of Precision Feed Management projects which put an emphasis on homegrown high quality forages to increase the percentage of forages being fed dairy cattle. One of the valuable technologies available to increase forage concentrations in dairy cow diets is to use BMR corns which have a more digestible fiber content and allow the cow to increase dry matter intake and improve milk production.

To date little if any local data has been available to confirm that the application of a fungicide to field corn will improve the yield and quality of corn silage and in particular that with BMR genetics. The location for this project is in the Schoharie Valley near Middleburg and Schoharie on a dairy farm that has applied fungicide to corn fields for the past two growing seasons following an outbreak of grey leaf spot in 2009. The dairy producer has continued to use fungicide applications to prevent a repeat of the 2009 disease pressure and reducing the risk of yield and quality losses and the mycotoxin content in forage. The owner's intent for 2012 was to only apply a fungicide if scouting of fields identifies sufficient disease presence to justify an application.

Objectives:

1. Measure the effectiveness of a fungicide applied to corn to:
    a. Improve corn silage yield
    b. Improve corn silage quality
    c. Reduce mycotoxins
    d. Improve profitability
2. Determine if growers are able to make a more informed decision to use foliar fungicides.

Procedures:

1. A fungicide trial was established at Crossbrook Dairy Farm, Middleburg, NY during the 2012 growing season. A field (lat 42.623,lon -74.338) was planted to Mycogen F2F569, a BMR corn hybrid to be used for silage on the farm. This particular field was chosen because of the consistency of its soils (Barbour and Tioga loams) and that it set up conveniently for spray application and harvest.

   Fields on the farm were scouted up until tasseling for presence of disease and for disease severity but none were found to have any amount of disease pressure including the field chosen for this trial. The only disease present was Northern Leaf Spot caused by the fungus *Bipolaris zeicola (Helminthosporium carbonum)*.

   There were two treatments in the trial, fungicide and no fungicide with each treatment a minimum of 60 feet wide. An attempt was made to have six replications in the field but the best that could be accomplished when treatments were made was four replications. An application of 12 oz of Headline EC was made on sprayed August 6, 2012 at the R1, Silking stage.

   The trial was harvested September 7, cutting the middle 8 rows for the length of the field for yield sampling. Forage and mycotoxin samples were be obtained from the silage trucks for each sample. Samples were sent to to Cumberland Valley Analytic Services for forage quality analysis, mycotoxin screen and mold count. Partial budget analysis was used to determine if increases in silage yield or quality or anticipated increases in animal performance due to reductions in mycotoxins offset the cost of

material and application.

2. To date no resources or evaluations have been developed from this project but they will be over the coming months. Currently Field Crop Pest Management Meetings are scheduled at the end of January for all of the counties in the region where this information will be shared. A Corn Day is planned for February 2013 and the information will be shared at that venue. Hopefully a What's Cropping Up Article can be generated from this information.

Results and discussion:

Northern Leaf Spot was present but low in pressure as we had difficulty taking readings with a canopy rating of .875 for the treated and 1.1 for the non-treated. There was so little leaf pressure one plot was rated as 2% of the eight, all of the rest were zero.

The yield results (Table 1) indicate there was an increase in yield due to the fungicide treatment of .4 ton. There was no difference in the % DM so maturity seems unaffected by the fungicide treatment.

Table 1. Yield and Dry Matter (DM)

Treatment	FreshYield Tons/Acre	Yield @ 35% DM Tons/Acre	DM Yield Tons/Acre	% DM
Fungicide	17.7	18.4	6.43	36.4
No Fungicide	17.3	18.0	6.30	36.4
LSD (.05)	ns	0.27	0.12	ns

Although statistcally different, partial budget analysis was used to see if there was an economic difference. The fungicide cost with application was $61.95 per acre: Headline 12oz per acre ($46.60) + application ($15.36). Corn silage was valued at $50 for 35% DM ton assuming that there are 7 bushels shelled corn per ton of corn silage and the corn grain component is worth $7.00 per bushel. The .4 tons per acre increase would then be valued at $20 per acre. This increase in silage production does not offset the increased costs. It would take 1.24 tons of corn silage just to pay for the fungicide and application.

Table 2. Forage Quality

Treatment	% CP	% NDF	% Lignin	NDF % digestibility 24 hour	% Sugar	% Starch	NE, L Mcal/lb	% NFC
Fungicide	7.4	37.2	1.91	68.9	5.15	35.0	0.78	50.8
No Fungicide	7.3	40.0	2.05	67.9	4.63	33.4	0.77	48.1
LSD (.05)	ns	2.75	ns	ns	0.46	ns	ns	2.2

There appeared to be some quality differences based on fungicide treatment (Table 2.). There was no significant lignin or neutral detergent fiber (NDF) digestibility differences which would suggest that there is no change in fiber digestibility due to the fungicide treatements. However

there was a significant decrease in NDF and increase in sugar and non-fiber carbohydrates (NFC) for the no fungicide treatments in the trial. If sugars and NFCs are higher and the NDF lower it could be that the grain is making up a larger percentage of the total plant DM which might also explain the silage yield increase.

The only mycotoxin found was DON which was found in 1 rep of the no fungicide and 2 reps of the fungicide treatment making it hard to demonstrate any advantage to a fungicide application to reduce mycotoxins.

This is only data from one trial in one year with very little disease pressure but under these conditions claim has been made by the crop protectant industry to the "plant health" benefit of a fungicide application. Future trials need to be conducted to confirm the results of this project.

Project location(s):
This project was located in Schoharie County but, the regional field crop specialist in charge of the project works in a seven county area of Chenango, Fulton, Herkimer, Montgomery, Otsego, Schoharie and Saratoga Counties.